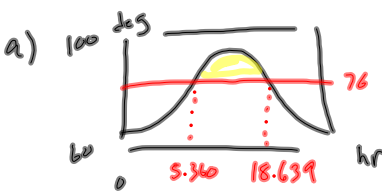


3.  $f(t) = 78 - 12 \cos\left(\frac{\pi t}{12}\right) \quad 0 \leq t \leq 24$

a) 

b)  $8 \leq t \leq 16 \quad \frac{1}{16-8} \int_8^{16} f(t) dt = 88$

c)  $t = 5.360, 18.639$

d)  $\frac{.08 \frac{\$}{\text{hr}}}{\text{deg}} = .08 \frac{\$}{\text{hr} \cdot \text{deg}} \int_{5.360}^{18.639} f(x) - 76 dx$   
 $= \$ 9.36$

Mar 13-7:25 AM

2.  $f(x) = 4x e^{3x}$

a)  $\lim_{x \rightarrow -\infty} 4x e^{3x} = 0 \quad \lim_{x \rightarrow \infty} 4x e^{3x} = \infty$   
 $\lim_{x \rightarrow \infty} \frac{-4x}{e^{3x}} = 0$

b) abs min  
 no endpts  
 $f'(x) = 4x \cdot 3e^{3x} + e^{3x} \cdot 4 = 4e^{3x}(3x+1)$   
 $4e^{3x}(3x+1) = 0$   
 $x = -\frac{1}{3}$   
 $\begin{array}{c} f' \\ - \quad 0 \quad + \\ -\frac{1}{3} \end{array}$  min at  $x = -\frac{1}{3}$  because  
 $f'$  changes from neg to pos  
 abs min  $-\frac{4}{3}e^{-\frac{1}{3}} = -\frac{4}{3e}$

c) y values  $(-\frac{4}{3e}, \infty)$

d)  $y = a x e^{bx} \quad a, b \text{ non zero, } a > 0$   
 abs min  
 $y' = (a \cdot b \cdot x + a) e^{bx} = 0$   
 $x = -\frac{1}{b}$   
 $y_{\min} = -\frac{a}{b} e^{-\frac{1}{b}} = -\frac{a}{be}$   
 $\begin{array}{c} - \quad 0 \quad + \\ -\frac{1}{b} \end{array}$

Mar 13-8:00 AM

review 7

inst rate, relation between  
ave rate  $f$  &  $f'$

$y = f(x)$  on  $[a, b]$

ave rate of  $f(x)$  on  $[a, b]$

$$\text{ave rate} = \frac{f(b) - f(a)}{b - a}$$

rh dg  
lh dg  
sdg

$$\text{inst. rate} = f'(x)$$

$$\text{ave rate} \approx \text{inst. rate}$$

Mar 13-8:17 AM

do #3 p110

$$\frac{8.32 - 6.15}{4 - 2}$$

Mar 13-8:25 AM

relation between  $f$  &  $f'$

$f'$  is slope of  $f$

$f' > 0$   $f$  increasing

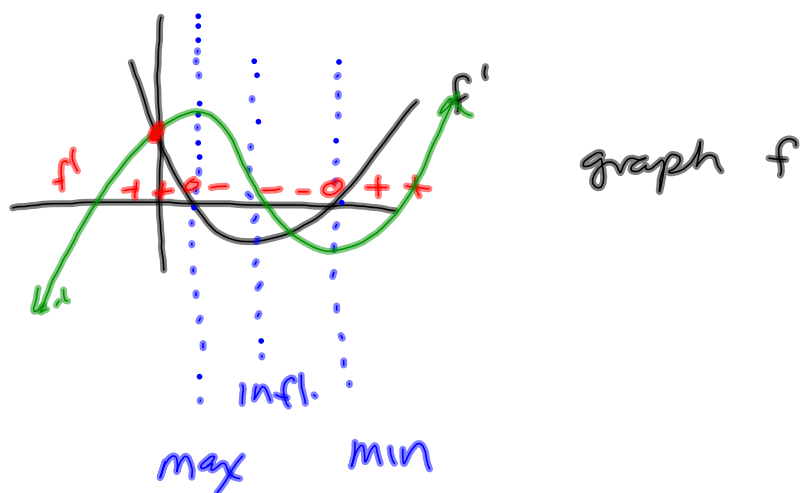
$f' < 0$   $f$  decreases

$f' : +0 -$   $f$  has a max

$f' : -0 +$   $f$  has a min

$f' : +0 +$   $f$  has flat point  
 $-0 -$

Mar 13-8:32 AM



Mar 13-8:35 AM